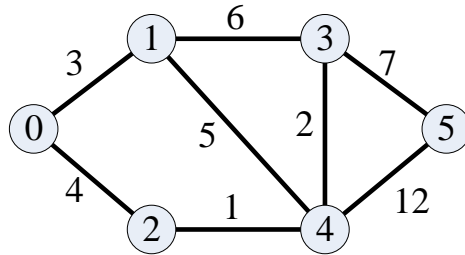


The point values for each question is given within []. The total number of points for this assignment is 15.

1. Consider graph  $G$ :



- [2] (a) Ignoring the edge weights, provide an adjacency matrix for the graph.
- [2] (b) Compute the number of paths of length 3 from vertex 3 to vertex 4, and then list each path.
- [2] (c) Does  $G$  contain an Eulerian path? Why or why not?
- [2] (d) Is  $G$  Hamiltonian? Why or why not?
- [4] (e) We can use Dijkstra's Algorithm to compute the shortest path from vertex 0 to all the other vertices in graph  $G$ . Complete each of the tables below that represent the state of the data structures used by Dijkstra's algorithm each time a vertex's shortest distance from vertex 0 becomes known.

Step 1

Vertex	Known	Distance	Previous
0	True	0	-1
1	False	3	0
2	False	4	0
3	False	$\infty$	-1
4	False	$\infty$	-1
5	False	$\infty$	-1

Step 2

Vertex	Known	Distance	Previous
0	True	0	-1
1			
2			
3			
4			
5			

Step 3

Vertex	Known	Distance	Previous
0	True	0	-1
1			
2			
3			
4			
5			

Step 4

Vertex	Known	Distance	Previous
0	True	0	-1
1			
2			
3			
4			
5			

Step 5

Vertex	Known	Distance	Previous
0	True	0	-1
1			
2			
3			
4			
5			

Step 6

Vertex	Known	Distance	Previous
0	True	0	-1
1			
2			
3			
4			
5			

- [2] 2. Which of the graphs in Figure 9.2.11 of your textbook are isomorphic? Produce the bijection for one pair of isomorphic graphs.
- [1] 3. How many edges does  $K_{10}$  have? Justify your answer.